REMARKS

I. Status of the Application

Claims 1-17 are presently pending in the application. Claims 1-17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Dunn et al., WO 91/01126. Applicants respectfully request reconsideration of the pending claims in view of the following remarks. A request for Continued Examination is being filed concurrently herewith.

II. Claims 1-17 Are Non-Obvious Over Dunn et al.

At page 2, section 3 of the instant Office Action, the Examiner has maintained the prior rejection of claims 1-17 as being obvious over the liquid materials of Dunn et al., WO 91/01126 that are used to make an implantable membrane. The Examiner believes that Dunn discloses many of the essential elements of the claimed invention differing only in the order of manufacturing steps leading to the claimed implant. The Examiner believes that the order of manufacture is not critical to the claimed implant. The Examiner has therefore shifted the burden to Applicants to demonstrate that the claimed implants are patentably different from the liquid materials of Dunn. Applicants respectfully traverse the Examiner's rejection of the claims over Dunn.

As stated in Applicants' prior responses, Dunn is very clearly directed to liquid materials used for making implants. Dunn et al. teaches liquid materials that are injected (page 11, lines 2-5) or implants that are cured/set outside the body from the liquid materials (page 2, lines 27-29 and page 4, lines 12-14). For reasons of record, Applicants respectfully submit that the claimed implant and method which feature a rigid matrix in which a plasticizer is then dispersed are patentably distinguishable over the liquid materials of Dunn.

In addition, Applicants have used the commercially available Atrisorb material which includes liquid poly(DL-lactide) and N-methyl pyrrolidone believed to correspond to the liquid material of Dunn to create a polymer membrane structure. See http://www.atrisorb.com/Dental/AtrisorbPI.pdf and tab A for further details on the Atrisorb product. The resulting structure, shown in cross section in the electron micrograph at tab B is a continuously porous structure from end to end of the membrane. Without wishing to be bound by scientific theory, it is believes that the continuously porous structure is due to the homogeneous liquid solution of poly(DL-lactide and N-methyl pyrrolidone that is used to make the membrane.

In contrast, Applicants claimed implant begins as a rigid nonporous matrix that is then contacted, such as by soaking, with the plasticizer to make the rigid matrix more flexible. The plasticizer then exits the matrix resulting in the matrix becoming less flexible. The resulting membrane, shown in cross section in the electron micrograph at tab C reveals a distinctly different physical structure than the membrane of tab B. Applicants' membrane is shown to be porous at either end of the implant while being nonporous at the center.

The highly porous nature of the tab B membrane is responsible for the reduced strength and rigidity when compared to Applicants' membrane shown at tab C. Applicants believe that the advantageous rigidity and strength of Applicants' membrane is due to the unique inner nonporous structure. Accordingly, the claimed implant is better able to maintain its integrity after implantation than the implants of Dunn et al. Furthermore, due to its novel structure, Applicants' claimed implant can be made thicker than implants made using the teachings of Dunn et al. Because of such characteristics as thickness, strength and rigidity, Applicants' claimed implants are suitable for use as a variety of surgical devices, such as fixation plates,

pins, screws and the like. As a result of their homogeneous porosity, however, the implants of Dunn et al. would lack sufficient strength to render them suitable for such uses. Indeed, Dunn et al. merely teaches that their implants are useful as biodegradable barriers placed adjacent to the surface of a tooth to aid in the restoration of tissue and to retard the migration of epithelial cells along the root surface of a tooth (abstract). For at least these reasons, the claimed implants are functionally different than the implants of Dunn et al.

The Examiner states that it would be within the level of skill in the art to manipulate the order of the procedure in order to determine the most effective manufacturing method, and that it would have been obvious to one of ordinary skill in the art ***to follow the teachings and suggestions of Dunn*** et al. in order to rebuild periodontal tissue after surgery (Office Action, page 3, section 6). The Examiner asserts that a skilled artisan would have expected to attain a porous, biodegradable implant useful in rebuilding periodontal tissue after dental surgery. Applicants disagree.

Dunn et al. provides no teaching or suggestion that their implants should be flexible and rigid prior to insertion or that the bending resistance of their implants prior to the insertion of the implants into an organ system is substantially lower than after its insertion into the organ system, as claimed by Applicants. Nor does Dunn et al. recognize any advantage or significance for doing so. In fact, Dunn et al. teaches that the porous structure of their implants "is ***essential*** to proper tissue regeneration and substantially different from the polylactic acid membranes described in the literature" (page 3, lines 28-32, emphasis added). Thus, contrary to the Examiner's assertion, if one of skill in the art was to follow the teachings of Dunn et al., he would find no motivation to look to Applicants' invention which would alter the pore distribution of the Dunn et al. implants to arrive at Applicants' implant made by immersing the

rigid matrix in the plasticizer. Thus, based on the teachings of Dunn et al., one of skill in the art would not arrive at Applicants' claimed invention.

Accordingly, as Dunn et al. fails to teach or suggest Applicants' claimed invention, Applicants request that the rejections of claims 1-17 under 35 U.S.C. §103(a) be reconsidered and withdrawn.

III. CONCLUSION

Having addressed all outstanding issues, Applicants respectfully request entry and consideration of the foregoing amendments and reconsideration and allowance of the case. To the extent the Examiner believes that it would facilitate allowance of the case, the Examiner is requested to telephone the undersigned at the number below.

Respectfully submitted,

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ATRISORB® FreeFlow™

Bioabsorbable Guided Tissue Regeneration (GTR) Barrier

⚠ INSTRUCTIONS FOR USE

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ATRISORB® FreeFlow™ Bioabsorbable Guided Tissue Regeneration (GTR) Barrier

Formulation Description
The ATRISORB® FreeFlow™ Bioabsorbable Guided Tissue Regeneration (GTR) barrier is formed using a flowable polymeric formulation composed of poly(DL-lactide) (PLA) dissolved in *N*-methyl-2-pyrrolidone (NMP).

Device Description
The ATRISORB® FreeFlow™ GTR barrier contains foil pouches each containing single-patient use syringes of 0.5 g ATRISORB® polymer formulation, and general use stainless steel cannulae for application of the formulation.

Mechanics
The ATRISORB® FreeFlow™ GTR barrier functions as a guided tissue regeneration barrier by isolating the regenerative surgical site from the adjacent gingival connective tissue and epithelium. This facilitates population of the surgical site with cells from the periodontal ligament and adjacent alveolar bone that lead to regeneration.

Storage
15°—30° C (59°—86° F)

How Supplied
The ATRISORB® FreeFlow™ GTR barrier is supplied as sterile, single-patient use syringes.

ATRISORB® FreeFlow™ GTR Barrier - Indications
ATRISORB® FreeFlow™ GTR barrier is indicated for the surgical treatment of periodontal defects to aid in the regeneration and integration of tissue components in guided tissue regeneration procedures. ATRISORB® FreeFlow™ GTR barrier is not intended for use in defects outside the indications statement.

ATRISORB® FreeFlow™ GTR Barrier - Contraindications
Patients who are allergic to NMP or PLA should not be treated with this product. The ATRISORB® FreeFlow™ GTR barrier is contraindicated in those situations where general periodontal surgery should not be performed. There are currently no known additional contraindications to the use of the ATRISORB® FreeFlow™ GTR barrier.

ATRISORB® FreeFlow™ GTR Barrier - Evaluation of Treatment Effects
The duration of treatment for Guided Tissue Regeneration (GTR) is the same as conventional regenerative periodontal surgery; standard clinical practice has defined this time period as 12 months. If after 12 months, the treatment using the ATRISORB® FreeFlow™ GTR barrier has not been successful, retreatment may be considered.

ATRISORB® FreeFlow™ GTR Barrier - Adverse Reactions
Possible complications with any periodontal surgery include thermal sensitivity, gingival recession, flap sloughing, resorption or ankylosis of the treated root, some loss of crestal bone height, perforations or abscess formation, infection, pain, gingival irregularities, and complications associated with the use of anesthesia.

ATRISORB® FreeFlow™ GTR Barrier - Precautions
The ATRISORB® FreeFlow™ GTR barrier has not been clinically tested in pregnant women.

The ATRISORB® FreeFlow™ GTR barrier has not been clinically evaluated in patients with conditions involving extremely severe defects with very little remaining periodontium.

The ATRISORB® FreeFlow™ GTR barrier has not been clinically tested for use in the regeneration of alveolar bone, either in preparation for or in conjunction with the placement of endosseous (dental) implants or in the treatment of failing implants.

The ATRISORB® FreeFlow™ GTR barrier cannot be resterilized. Do not use if pouches have been previously opened or damaged, or if the cannulae heat stakes are broken.

The ATRISORB® FreeFlow™ GTR barrier has not been clinically tested in immunocompromised patients (such as patients immunocompromised by diabetes, chemotherapy, radiation therapy, or infection with HIV).

Instructions for Use
Preparations for Application of the ATRISORB® FreeFlow™ GTR Barrier

This guide provides detailed instructions for formation of the ATRISORB® GTR barrier using the FreeFlow™ application (in situ) method.

Patient Selection

Patients selected for GTR should be free from medical disorders that are general contraindications for periodontal surgical treatment. They should have established their willingness and ability to perform adequate oral hygiene. Smoking may affect outcomes following periodontal surgery. Treatment of patients who smoke is at the discretion of the clinician.

Defect Selection

The ATRISORB® FreeFlow™ (in situ) technique requires the use of bone replacement graft material.

Regenerative therapy should only be performed in defects where a reasonable likelihood of success exists. When treating furcation defects, Class II furcation defects are often considered good candidates for GTR treatment. However, size, defect morphology, and location of these defects vary considerably, and as a result, the predictability of success in these areas may be quite variable. When treating intrabony sites, defects deeper than 3 mm have greater potential for regeneration.

Based on these factors, general guidelines for defect selection are as follows:

Favorable
Class II furcation defects, intrabony defects deeper than 3 mm

Less Favorable
Class III furcation defects, horizontal defects (0-walled), and shallow intrabony defects

Presurgical Treatment

Oral Hygiene Instructions
Before undergoing GTR surgery, patients should receive oral hygiene instruction and demonstrate a willingness and ability to perform adequate plaque control.

Scaling and Root Planing
Scaling and root planing are generally recommended prior to surgery. The resulting improvement in tissue health will aid flap reflection and manipulation.

Presurgical Medication
Antimicrobial oral rinses such as chlorhexidine should begin the day before the planned surgery. At the discretion of the clinician, antibiotics may begin the day before surgery as well. Use of antibiotics should follow recommendations in standard clinical practice.

ATRISORB® FreeFlow™ GTR Barrier Formation
FreeFlow™ Application (In Situ) Method

1. Perform standard full-thickness flap surgery including debridement of soft tissue, and scaling and planing of the root surface (including the furcation region, if involved). Assure that flap reflection is adequate to provide sufficient access for placement of the barrier.
2. Fill the defect with bone replacement graft material as per manufacturer's instructions.
3. Firmly twist a blunt-ended cannula onto the syringe and bend cannula to an appropriate angle. Expel air from the syringe.
4. Tilt the patient's head to facilitate barrier placement. Appropriate head position is one that takes advantage of gravity in placing the barrier.
5. Assure through evacuation that the surgical field remains as saliva-free and hemorrhage-free as possible taking care not to disturb the bone replacement graft.
6. Hold the cannula tip 1– 2 mm away from the graft and apply the fluid polymer from the syringe so there is a continuous flow of polymer.
7. Express the polymer from the syringe to cover the graft and defect site. The polymer should cover the graft, be in intimate contact with the tooth surface, and extend slightly over the adjacent alveolar bone.
8. Mist the barrier with a fine spray of sterile water or saline (i.e., from the highspeed or ultrasonic handpiece) for approximately 10 – 20 seconds to facilitate the initial "set" of the barrier.
9. Inspect the precipitating barrier. If additional polymer is required it can be added from the syringe in the manner previously described. The newly added polymer is then "set" with the sterile water or saline spray.
10. Do not disturb the barrier after it has been placed and formed. Close the surgical wound with sutures.
11. Place periodontal dressing at the surgical site.

Barrier Exposure
Some barrier exposure may occur during the initial healing. The exposed material should not be trimmed because of the possibility of disrupting the healing tissue and/or site. Instruct the patient to keep the exposed material clean by applying chlorhexidine directly to the site twice daily with a cotton tip applicator. Generally, this material will disappear by 6 to 8 weeks following surgery due to absorption or attrition.

The granulation tissue that forms at the surgical site under the barrier may cause barrier displacement. In these cases, it is recommended that, if necessary, periodontal dressing such as Coe-Pak™ periodontal dressing be replaced weekly to assure that the barrier remains in place through the first 4 weeks.

Postoperative Considerations

Postsurgical Care
It is imperative that regenerative sites be kept free of plaque accumulation. Also, mechanical disruption of the healing site should be avoided. The following recommendations are made:

1. For 8 weeks following surgery, the patient should not clean the treated area by brushing, flossing, using a toothpick, or other interdental cleaning techniques.
2. During this period, rinsing or direct application with an anti-infective agent such as chlorhexidine, is strongly recommended. After this 8 week period, mechanical tooth cleaning can resume.
3. Professional removal of supragingival plaque should be performed every week for 4 weeks, then bi-weekly through 8 weeks.
4. Probing the surgical site for treatment evaluation and subgingival scaling should not be done until at least 6 months following surgery.

ATRISORB® FreeFlow™ GTR Barrier - Use of Antibiotics

Antibiotic therapy is provided at the discretion of the clinician and should adhere to recommended regimens in standard clinical practice. Antibiotic coverage is often provided following regenerative surgeries as part of postoperative care. In cases of postsurgical infection or abscess, it may be necessary to remove the ATRISORB® FreeFlow™ GTR barrier depending on the severity of the complication.